Exploring the Existing Situation of Education Management Information System Facilities at the Government College Level in Bangladesh

Sushanta Roy Chowdhary[*] & Sheikh M. Nurullah[**]

Abstract

The study aims to investigate the existing situation of EMIS facilities at the government colleges' level in education management in Bangladesh. A descriptive research design and mixed methods were used in this study. A simple random sampling method was also used in the research. The population size was 307, and the sample size was 74 in this study. For data collection, semi-structured questionnaires were applied to the survey. The SPSS Version 20 software is used for data analysis in this study. Frequency distribution, means, percentages, bar charts, and pie charts are also used in this research. It was found that there is a lack of IT staff, and they do not have sufficient EMIS-related quality training. Different types of physical facilities and hardware components (office space, computer lab, computers, alternative elasticity arrangements, servers, printers, multimedia, photocopiers, scanners) are not adequate, and internet speeds are not good for EMIS-related work. For online data entry and access to processed data, GCs are using email, mobile, and manual processes for their official communication for academic and administrative purposes. All responding GCs are keeping data backups, with the majority using a hard disc and some using a pen drive. It is also revealed that the internal financial ability of most of GC is not good for the required annual cost of developing ICT units. These findings may help identify the existing problem of EMIS facilities in Bangladesh and develop EMIS-related plans, strategies, and policies.

Keywords: *EMIS, Training, ICT infrastructure, Hardware and Software facilities, Networking, Communication, Data entry, Record system, Fund.*

1. Introduction

The Education Management Information System (EMIS) is an IT-based information system that collects, stores, processes, analyzes, and disseminates

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information to educational managers at different management levels for planning and decision-making (Chowdhary, 2022). EMIS collects various statistical data and information from the educational institute and disseminates extensive, compact, pertinent, probable, unequivocal, and well-timed information to responsible educational administrators and supervisors to complete their duty to accomplish the target objectives (Ugwoke & Iruke Samuel, 2015; Bhatti & Adnan, 2010). Educational data from schools, students, teachers, and staff is accumulated through an EMIS, which is the repository for formulating, analyzing, and reporting related information (Carrizo, Sauvageot, & Bella, 2003a). In the past, pen and paper-based information systems were used. On the other hand, mainly hardware, software, and internet-based information systems are being used at present (Chitolie-Joseph, 2011). An information system refers to an organized unification of people, hardware, software, communications networks, and data resources that collects metamorphoses, and disseminates information in an organization (O'Brien, 1999, cited in Kawalek, 2008).

The Ministry of Education (MoE) of Bangladesh took part in the SESDP (Secondary Education Sector Development Project), which established a centrally computerized EMIS cell in 2012 under the planning division of DSHE. SESIP (Secondary Education Sector Investment Programme) is continuing support to the development of EMIS. The Asian Development Bank (ADB) and the World Bank had given funds to the SESDP and SESIP projects for establishing EMIS (English in Action, Workshop Report, 2013; EMIS CELL, DSHE, version v7.0). The supportive activities of ICT as a technology are innovation, record, application, and communication of information, execution, and utilization of ICT, which have led to the display of different kinds of microelectronic and telecommunications machinery such as laptops, computers, computer networks, the web, digital printers, and mobile technology (Adebayo, 2013; Kokt & Koelane, 2013).

Information systems may be very beneficial in developing countries (Solaymani, Sohaili, & Yazdinejad, 2012). There are increasingly more nations that have followed the EMIS and have already failed (Wako, 2003b); the most probable reason for the shortage of the EMIS structure is that it is inadequate in managing the fast-developing needs for information (Moses, 2000; Al-Koofi, 2007). It is without question that technology has driven the revolution of system functions and communication (Orina & Luketero, 2018). It is noted that the ICT infrastructure element, trained manpower, and funding are essential elements of effective EMIS. There is an idea about essential elements of effective EMIS at the government college level. Colleges are the main producers and users of data and information. So, good elements of EMIS are needed for government colleges.

In using EMIS, Bangladesh has faced various problems like other developing countries because teachers and educational managers at Government Colleges (GC) have little knowledge about EMIS. The fact that many colleges are still faced with operational inefficiencies, a lack of proper training in the use of EMIS, and challenges that arise due to the implementation of EMIS poses the question of the extent to which managers are using the data and information generated from the technology for planning as well as decision making. Therefore, many educational managers in Bangladesh have expressed mixed arguments about the success of EMIS. So the researcher wants to investigate the existing situation of EMIS facilities at college education management in Bangladesh. However, due to a lack of knowledge and resource constraints regarding EMIS, many principals and teachers in Bangladesh cannot handle it properly and face various problems. All of the referring studies have been conducted in foreign contexts and at various educational levels. So, the researcher has taken the issue as a subject of study.

2.0 Review of Literature

2.1 Human resources / Manpower's

Technical expertise in human resources is the most important of all the elements in the EMIS. In a study in Vietnam, Thanh et al. (2018) argued that information systems are facing challenges with data loss, and to solve this issue, high-quality, sufficient technical expertise and human resources are needed (Cabrera et al., 2006). Su et al. (2017) have argued that the IT-skilled human factor is momentous for the use of IS in government institutions. Human resources are needed for the improvement and implementation of a modern IS and are related to the analysis of problems of organizational, systematic, hardware, and software nature (Kurylev et al., 2017). Both technical and professional knowledge of staff and system managers is required to apply the proper IS in educational organizations (Rodriguez-Diaz et al., 1997). If human and organizational components are not carefully considered in the application procedure of IS, the system will not run efficiently (Irani et al., 2001).

2.2 Training and Training quality

Training is the methodical procedure of changing the attitude of employees in a direction that acquires institutional objectives (Ivancevich, 2010). It is one of the necessary elements of EMIS, but modern technology is rapidly altering, training must be observed as a flowing action, and administration has to give higher endeavor (Wako, 2003b). Though many staff can run computers properly, they cannot perfect IS for their daily targeted work (Abdullahi, Baharom, & Rahman, 2018). So, several series of trainings and workshops about ICT are necessary for expertise (Ismail & Affandy, 2013; Abdullahi et al., 2018).

In Bangladesh, the absence of adequate and quality training for teachers, administrative staff, and principals impacts the fruitful application of ICT in an

academic institution (Mamun & Tapan, 2009; Afshari et al., 2009). The absence of training is one of the main causes of the collapse of IS (Somer & Nelson, 2001; Rajan & Baral, 2015). Nawaz et al. (2019) noted that good training improves employees' professional skills. Thus, the most effective training program can build confidence and highlight perceived benefits among the end-users of accepting and using an information system (Aladwani, 2001).

According to Wako (2003b), basic, intermediate, and advanced are the three steps of training that are required for the staff of educational institutions. Basic training is not sufficient for staff to operate the EMIS activities. But all staff will not require advanced training. Again, advanced training is needed to improve the usefulness, novelty, and sustainability of EMIS.

2.2.1   Basic training

All employees of EMIS and educational organizations with the Ministry of Education require basic training. They must know about computer operating systems, word processing, spreadsheet software, database operating knowledge, and internet uses. In addition, self-learning should be motivated to help staff adjust to the changing environment (Wako, 2003b).

2.2.2   Intermediate training

Intermediate training is needed for those staff who have basic knowledge of computers but lack the necessary extra efficiency required to achieve the institutional objectives. It is to increase the skills of data entry staff in the basics of operating systems and troubleshooting. This training focuses on the maintenance of ICT, for example, the use of SPSS with different statistical software, which is given by experts, statisticians, and researchers (Wako, 2003b).

2.2.3   Advanced Training

Advanced training is essential for staff to be self-sufficient in major EMIS areas: management, data analysis, programming, networking, and data processing. In addition, the role of EMIS in the interpretation of technical efficiency and assistance in research and development must be inspired to attend to the development of the system and the long-term management of changes. It is also necessary to note that a training program is provided for EMIS staff at all levels of administration (Wako, 2003b).

ICT Infrastructure and Process

ICT infrastructure refers to the tangible resources an organization owns, together with any hardware and software that can be used to support technology usage (Li et al., 2018; Arifin and Tajudeen, 2020). ICT includes physical assets such as hardware and software, and it has been suggested that ICT infrastructure plays a vital role in encouraging organizational IT usage (Bhattacherjee and

Hikmet, 2008). By using ICT, different Academic Information Systems (AISs) have been used to assist daily functions, which have been shown to improve operative proficiency (Mahenge & Sanga, 2016; Kayanda et al., 2020) in higher educational institutions. In Tanzanian secondary schools, Nkata and Dida (2019) found that 30 % of secondary schools lacked ICT infrastructure for supporting web-based information systems. However, ICT infrastructure depends on hardware and software facilities, networking, internet facilities, communication, data entry, and record systems. In this section, the researcher has discussed the following:

2.2.4   Physical facilities/ Hardware and Software facilities

Facilities of ICT refer to technological instruments such as computer systems, internet service, printers, photocopiers, individual websites, telephones, mobile phones, facsimiles, video conferencing, scanners, teleconferencing, etc. In developing countries, IT infrastructure, computer equipment, software, technical support, maintenance of computer units, and arrangement of required supply equipment to EMIS units are insufficient in the various organizations at various levels (Chitolie-Joseph, 2011; Shah, 2008).

In Bangladesh, the scarcity of hardware and software for computers is another main obstacle to implementing ICT within educational institutions (Khan et al., 2012). Numerous factors obstruct the application of ICT; these are the non-availability of the requisite power supply, insufficient ICT facilities, absence of adequate internet service, illiteracy of technological tools, leadership problems, lack of staff training programs, and weather issues (Nwosu & Ogbomo, 2011; Anene et al., 2014).

2.2.5   Networking

Administrators install the software on systems, configure and support the institutions on Local Area Network (LAN), Wide Area Network (WAN), and the Internet, which are responsible for maintaining the hardware and software networks (Margaret et al., 2018; Sodhar et al., 2019). The management of colleges and universities has also entered the era of information management with the rapid development of modern computer network technology (Ge, 2021). It makes file management work faster, safer, and more effectively.

2.2.6   Internet facilities

The Internet is the most significant tool for ICT. Without internet facilities, any information system cannot run effectively. All administrators, administrative staff, and faculty members want quality internet facilities to use with the help of ICT tools for data processing and transmitting (Margaret et al., 2018; Sodhar et al., 2019). Khan et al. (2012) argued that a high-speed internet connection is another prerequisite for integrating ICT in educational institutions.

2.2.7   Communication, Data Entry, and Record system

Information technologies are supported by processing wont to store, retrieve, transmit, and manipulate data during a short period of users' time (Tokgoz & Erdogan, 2016; Pol Lim, 2017). IRMT (1999a) defines electronic records as records that can be manipulated, transmitted, or processed by a computer. However, electronic records are recorded on media such as magnetic tapes or discs (CD, DVD, or pen drive) that support decision-making.

Budget/ Funds

ICT is supported by hardware, software, the internet, audio-visual aids, teaching aids, and other accessories that demand a huge budget. Mumtaz (2000) explained that a lot of scholars proposed that the shortage of budget to get the required hardware and software is one of the reasons teachers don't use technology in their classes. These costs are, in most cases, bloated and can't be provided by most developing countries, including Bangladesh.

Setiawan, Satori, and Munir (2018) argued that the adequacy of a budget is needed for quality ICT function. Establishing a technological infrastructure also means providing adequate budgetary resources not only for technology acquisition but also for maintenance (Lessen & Sorensen, 2006).

3.0 Research Methods

3.1 Research design

In this study, a descriptive research design is applied to realize its objectives. It focuses on consistently describing a scenario or space of interest factually and accurately. It cares about the current and endeavors to identify the condition of the phenomenon under this research. This design is applied owing to its efficiency in producing a snapshot of the present state of affairs (Stella, 2014).

3.2 The research Method

The researcher for this study has adopted a mixed-method approach combining both quantitative and qualitative approaches. A combination of qualitative and quantitative techniques allows for a better and deeper understanding of a problem. A mixed-methods research design is a method for collecting, analyzing, and "mixing" both quantitative and qualitative strategies in a single study or a sequence of research to comprehend a research problem (Creswell & Plano Clark, 2011 mentioned in Creswell, 2012).

3.3 Target population

In this study, the target population comprised 307 principals of Government College in Bangladesh, which was the sampling unit for the study. The researcher collected the list of government colleges from the EMIS cell in 2015.

3.4 Sampling procedures and Sample size

Random sampling techniques were used in this study because they enabled the researcher to achieve a fair representation of the various respondents to be chosen for the study. The following formula has been used in determining sample size (Cochran, 1977).

$$n_0 = \frac{z^2 \times p \times q}{a^2} = 96$$

$$n = \frac{n_0}{1 + (n_0 - 1)/N}$$

Where n_0=primary estimated sample size; p=the probability; q = (1-p) is the reverse probability; z=the area of the standard normal curve under certain confidence limits; a=the desired level of precision; N=population size; and n=sample size.

N =307; Let, P=0 .5, q= (1-0.5) = 0 .5, Z=1.96

$$n_0 = \frac{(1.96)^2 \times 0.5 \times 0.5}{(0.10)^2} = 96$$

$$n = \frac{n_0}{1 + (n_0 - 1)/N} = \frac{96}{1 + (96 - 1)/307} = 74$$

3.5 Data collection

In this research, the data collection was carried out through a survey. The survey questionnaire was divided into structured (close-ended) and open-ended questions, whereby respondents were given a chance to respond by giving a personal opinion. These were given to different principals in the GC, who thereafter gave the necessary information and details. The survey questionnaire has been separated into two sections, A and B. Section A outlined the required general information, and Section B represented the research objective. The researcher was supported by six helpers in the distribution and accumulation of questionnaires as well as carrying out surveys. The principals are requested to fill out one survey questionnaire with the help of the researcher and helpers.

The researcher engaged in both primary and secondary data. The source of primary data was obtained from the principals of GC. Secondary data were obtained from the various reports, books, journals, conference papers, and other available data schedules that were relevant to this study.

Instruments of data collection

This investigation particularly utilized a semi-structured questionnaire to find the answers to the study's research questions. During this research for survey

questions, the data collection tools used semi-structured questionnaires that are comprised of both closed and open-ended questions.

The researcher attentively designed the survey questionnaire with the help of a review of the literature and some special researchers such as Al Koofi (2007), Shah (2008), and Sarwani (2003). It included the tools of yes-no questions, three, four, and five options, and open-ended questions. This question has also been formulated on a five-point scale, where 1= bad, 2 = fair, 3 = good, 4 = excellent, and 5= no opinion. This questionnaire contains 15 prime items, and most of the items are closed-ended, but some open-ended items are included in this study.

3.7 Data analysis tools, techniques and presentation

After collecting data and information from the study area through survey questionnaires, these data have been carefully checked, reviewed, tabulated, and analyzed. In this study, the researcher used SPSS Version 20 for data analysis. The examinee additionally employed descriptive statistics together with frequency distribution, mean, percentages, bar chart, and pie chart. The qualitative analysis involved the summarization of the opinions that respondents provided, which also constituted the findings and recommendations. The data was then presented in narrative form.

3.8 Reliability of data and Validity of instruments

The reliability test concerns the extent to which a measurement of a phenomenon provides a stable and consistent result. According to Bryman (2004), it refers to the consistency of the instrument in measuring whatever it measures.

A validity test refers to the degree to which an instrument accurately measures what it intends to measure. Validity is the degree to which a sample of test items represents the content that the test is designed to ensure (Gall et al., 2006). According to Nachmias and Nachmias (1996), if there is an agreement among the judges (specialists), the questionnaire has face validity and therefore measures what it is meant to measure.

The internal data consistency was realized from scores obtained from a single test administered to the pilot group of colleges. In this study, research tools have been provided to academic researchers and IT professionals to get their professional opinion. Accordingly, they gave their views and remarks, which had been included in the revised version. The revised version of the questionnaires will be pilot-examined in the Rajshahi district of Bangladesh.

4. Result

4.1 General information

Table 4.1: Demographic data

		Principal (GC)	
		Frequency	*Percent*
Age range of principals	35 – 45	2	2.7
	45 – 55	10	13.5
	55 & above	62	83.8
	Total	**74**	**100**
Working experience	1- 5 years	*65*	*87.84*
	6-10 years	*8*	*10.81*
	11- 15 years	*0*	*0*
	16 years and above	*1*	*1.35*
	Total	*74*	*100*
Education qualification	MA	34	45.9
	MSS	10	13.5
	M.Com/MBS/MBA	13	17.6
	MSC	14	18.9
	MPhil/PhD	3	4.1
	Total	**74**	**100.0**

Source: Research Survey, 2021

According to table 4.1, 83.8 percent of GC respondents are over the age of 55. There are 87.84 percent of GC principals with working experience between 1- 5 years. Only 4.1 percent of respondents with GCs have an MPhil or Ph.D. degree.

4.2 Human Resources

Table 4.2: Existing IT Staffing Position in college-level

Posts	Number of Existing Staffing Positions			Number of fulfilled in position			
	Fixed	*Tempora ry*	*Total; N=74*	*Fixed*		*Temporary*	
				Male	*Female*	*Male*	*Female*
1	2	3	4= 2+3	5	6	7	8
Data Entry Officer	-	2(2.70)	2(2.70)	-	-	2(2.70)	-
Computer Lab Assistant	3(4.05)	32(43.24)	35(47.30)	3(4.05)	-	22(29.73)	10(13.51)
Computer operators	67(90.54)	7(9.46)	74(100)	66(89.19)	1(1.35)	5(6.76)	2(2.70)

Source: *Research Survey, 2021*:Note:() is indicate % (Percentage)

From table 4.2, it is found that 90.54 percent fixed and 9.46 percent temporary computer operators are working, with 89 percent male and 1.35 percent female in permanently. 4 percent permanent and 43 percent temporary computer lab assistants are working, with only 4 percent male in permanent and 30 percent male in temporary.
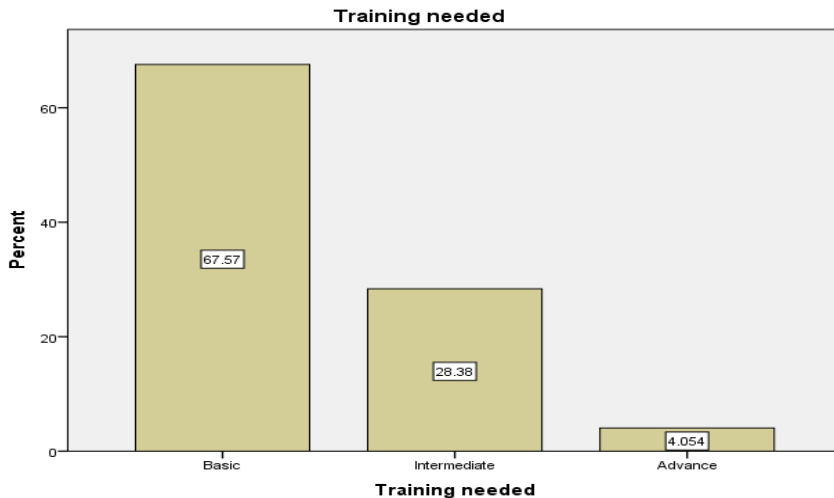
4.3 Training

Table 4.3: Existing Employees have EMIS training

		GC	
		Frequency	*Percent*
Valid	Yes	1	1.4
	No	73	98.6
	Total	74	100.0

Source: *Research Survey, 2021*

From the above table 4.3, it is shown that 1.4 percent of existing IT employees at GC have training. But 98.6 percent of the existing IT staff at GC have not been trained.
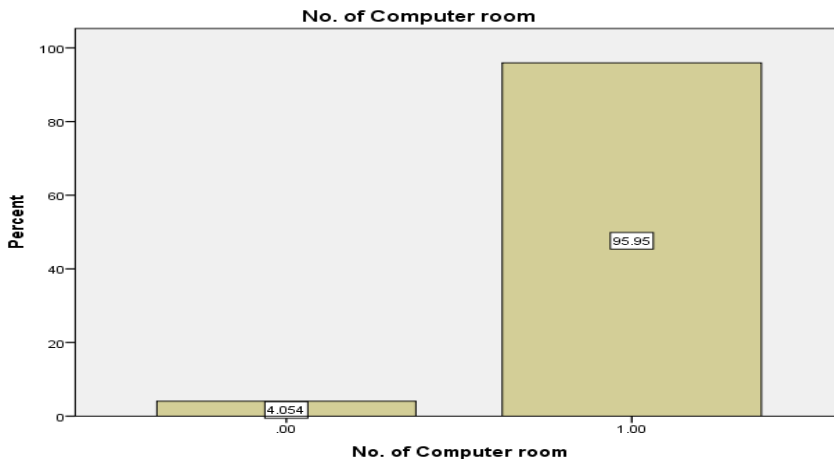

Figure 4.1: IT training need

From the above figure 4.1, it is shown that 67.57 percent of staff need basic training; 28.38 percent require intermediate training. In addition, advanced training is needed for 4.05 percent of office staff.

4.4 Physical Facilities and hardware

### 4.4.1 Existing number of computer rooms

Figure 4.2: No of computer room

As shown in Figure 4.2, 4.05 percent of GC has no computer room for IT-related official work. 95.95 percent of GC is allotted only one room for using IT-related official work.

4.4.2 Existing number of computers and computer lab

From the survey, it was found that the average number of computers in GC 13(thirteen). 16.2 percent of GC have computers among 1 (one) to 10(ten). But 47.3 percent of responding colleges have the highest number of computers 15 (fifteen).
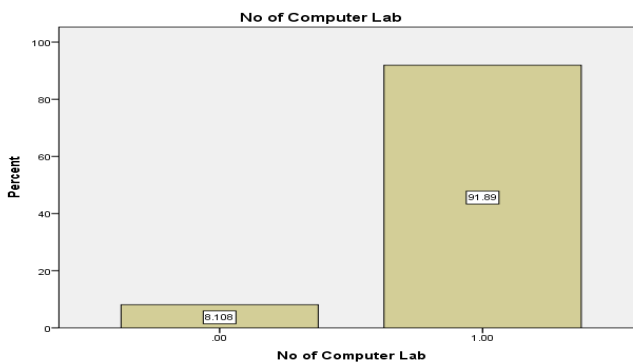
Figure 4.3: Number of computer lab in GC

From the above Figure 4.3, it shows that 8.11 percent of respondents in GC do not have computer labs. 91.89 percent of respondents to GC have only a single computer lab.

4.4.3 Electricity connection and Alternative Arrangement of Electricity in College

All responding colleges in GC have electricity connections. It is a good sign for colleges.

Table 4.4: Alternative Arrangement of Electricity in Colleges

		Frequency	*Percent*
Valid	No/Nil	-	-
	Solar	-	-
	IPS	67	90.5
	Generator	1	1.4
	IPS & Generator	6	8.1
	Total	**74**	**100**

Source: Research Survey, 2021

From the above table 4.4, 90.5 percent of respondents in GC have IPS for alternative electricity. 1.4 percent of respondents in GC have the only generators for alternative electricity. Moreover, 8.1 percent of respondents in GC have both an IPS and a generator.

4.4.4 Sufficient facilities as per EMIS work

Table 4.5: Sufficient facilities as per EMIS work

		Frequency	*Percent*
Valid	Yes	6	8.11
	No	68	91.89
	Total	**74**	**100**

Source: Research Survey, 2021

According to Table 4.5, only 8.11 percent of respondents in GC think that their IT-related physical facilities are sufficient for EMIS work. On the other hand, 91 percent of respondents in GC think that their IT-related physical facilities are not sufficient as per EMIS requirements.

4.4.5 Requirements of facilities

4.4.5.1 Need room

1.35 percent of respondents in GC do not need room for an EMIS cell. 98.65 percent of respondents in GC need a minimum of one room for the EMIS cell.

4.4.5.2 Need computers

1.4 percent of respondents in GC do not need computers. But 48.6 percent of respondents in GC need every 20 computers. 39.2 percent of respondents in GC have needed 25 computers. 1.4 percent of respondents in GC have needed 10 computers.
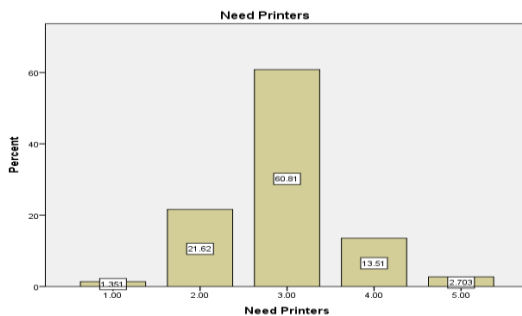
4.4.5.3 Need computer lab
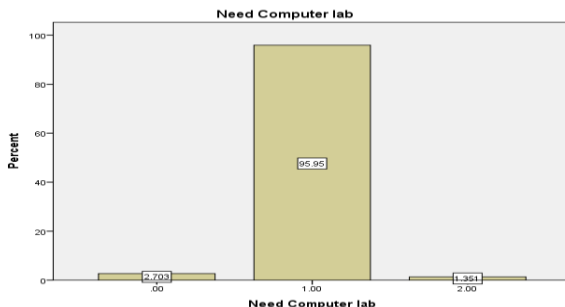
Figure 4.4: Need computer lab

From the above Figure 4.4, 2.70 percent of respondents do not need a computer lab. On the other hand, 95.95 percent of respondents need a computer lab. Only 1.35 percent of respondents need each of the two computer labs.

4.4.5.4 Need server

According to the survey, 100 percent of respondents need a server.

4.4.5.5 Need printers

Figure Error! No text of specified style in document..5: Need printers for GC

From Figure 4.5 above, 1.351 percent of respondents need a printer. 21.62 percent of respondents need two printers. 60.81 percent of respondents need

three printers. 13.51 percent of respondents need four printers. 2.7 percent of respondents in GC need five printers.

4.4.5.6 Need Multimedia

39.2 percent of respondents need every 5 multimedia. 6.8 percent of respondents need every six multimedia. 9.5 percent of respondents need every 10 multimedia. Averagely need 6 multimedias.

4.4.5.7 Need Photocopiers

9.5 percent of respondents need a photocopier. 73 percent of respondents need two photocopiers. 16.2 percent of respondents need three photocopiers. Only 1.4 percent of respondents need four photocopiers.

4.4.5.8 Need Scanners
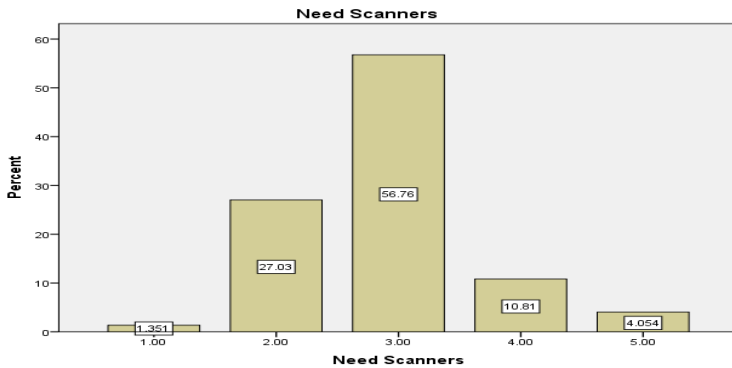
Figure 4.6: Need scanners

As shown in Figure 4.6, 27.03 percent of respondents need two scanners. 56.76 percent of respondents need three scanners. 10.81 percent of respondents need four scanners. 4.05 percent of respondents need scanners.

4.4.6 Software Facilities

4.4.6.1 Operating system

All respondents give the opinion that they are using the Windows operating system on their computers.

4.4.6.2 Using application software

GC uses application software such as MS Word, MS Excel, MS PowerPoint, Adobe Reader, Photoshop, Firefox, etc.

4.4.7 Computer Network Facility

4.4.7.1 Do you have a server in your institution?

Table 4.6: Server in institution

		Frequency	*Percent*
Valid	yes	2	2.7
	No	72	**97.3**
	Total	74	100.0

Source: Research Survey, 2021

From the above Table 4.6, 2.7 percent of respondents have a server in their institutions. 97.3 percent of respondents do not have servers in their institutions.

4.4.7.2 Do you have a Local Area Network (LAN) in your institution?

Table 4.7: LAN position

|		*Frequency*	*Percent*
Valid	Yes	4	5.4
	No	70	94.6
	Total	74	100.0

Source: Research Survey, 2021

According to Table 4.7, 5.4 respondents have a Local Area Network (LAN). But 94.6 percent of respondents in NGC and GC do not have LAN.

4.4.7.3 Which numbers of PC are operating for EMIS work?

56.8 percent of respondents are utilising two computers. 35.1 percent of respondents use three computers. 6.8 percent of respondents utilise four computers. 1.4 percent of respondents use five computers.

4.4.7.4 Among these computers, how many have good quality?
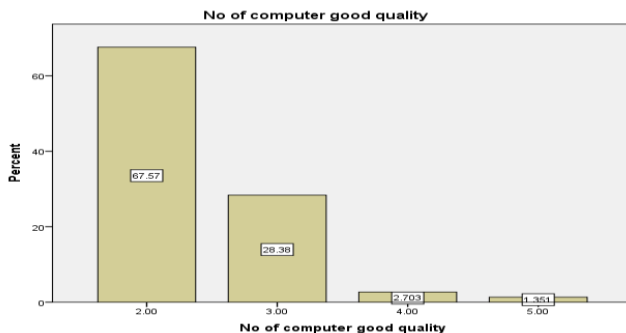
Figure 4.7: *No of computer good quality*

According to Figure 4.7, 67.57 percent of respondents have two good-quality computers among their computers for EMIS-related work. 28.38 percent of respondents have three useable, good-quality computers for ICT-related work. 2.70 percent of respondents have four good-quality computers for EMIS functions. 1.35 percent of respondents have five good-quality computers for EMIS work.

4.4.8 Internet Facility

4.4.8.1 Does the IT cell / Computer lab unit have internet connectivity?

The IT cell, or computer lab unit, has connectivity with the internet in all responding GC. It is good for GC.

4.4.8.2 Type of internet link

Table 4.8: Type of internet link

|		GC	
		Frequency	*Percent*
Valid	Radio link	36	48.6
	Broad Brand	3	4.1
	Both	35	47.3
	Total	**74**	**100.0**

Source: *Research Survey, 2021*

Table 4.8 above shows that 100 percent of respondents have internet connections. 48.6 percent of respondents have a radio link line. 4.1 percent of respondents have the Broad Brand line, and 47.3 percent of respondents have both lines.

4.4.8.3 Does every computer in the IT cell/ computer lab have access to the internet?

All computers are not connected to the internet line in the GC. It is noted that only a few computers in all colleges are connected to the internet.

4.4.8.4 Situation of internet speed
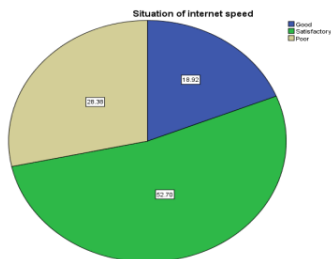
Figure 4.8: Situation of internet speed

From Figure 4.8, 28.38 percent of respondents in GC areas said internet speed is poor. 52.7 percent of respondents said the internet speed is satisfactory. 18.92 percent of respondents said internet speed is good.

4.4.8.5 How internet access is used?

GC has access to the internet for online data entry and access to processed data.

4.5 Communication

4.5.1 Website position

Table 4.9: Website position

		Frequency	*Percent*
	Yes	74	100.0
Valid	No	0	0
	Total	74	100

Source: Research Survey, 2021

100 percent of respondents to GC have an institutional website.

4.5.2 Data display on the website

The administration of GC can upload their academic and administrative data on the website.

4.5.3 When the website is updated?

Only 1.35 percent of respondents update the website. 9.46 percent of respondents update their website. 44.59 percent of respondents update their website on a monthly basis. 28.38 percent of respondents visited the quarterly website update. 16.22 percent of respondents update their websites annually.

4.5.4 Ways of communication among the officials

Table 4.10: Ways of communication among the officials

| Ways(uses)	Frequency	Percent
E-mail	74	100
SMS	74	100
Website	2	2.7
Video Conference	10	13.51
Mobile	74	100
Manually/ Others	74	100

Source: Research Survey, 2021

Table 4.10 shows that 100 percent of respondents in GC use email, mobile, and manual ways for communication among the officials. 100 percent of respondents use SMS, and 13.51 percent of respondents use video conferencing for communication among the officials. 2.7 percent of respondents use websites for communication among officials.

4.6 Data entry and Record

4.6.1 Types of data input in the Central EMIS cell

There are various types of data given to the Central EMIS cell by the colleges, such as institute information (college name, address, establishment date, institute type, etc.). Infrastructural Facilities [Types, Properties, and Ownership of Land (Decimal): Usage and Properties of Land (Decimal), Condition, Room Number and Volume of Building(s), Usage of Building(s), No. of Active Computers'; etc.] Class-wise student information, Designation Wise Teachers Information, Subject Wise Teachers, Allowed and Working Quantity Information, Educational Qualification Wise Teachers Information, Training Wise Teachers Information, Teachers Presence Information (Last Year), Inspection Information, Audit Information, Institute furniture and materials Information, Institutional Common & Other Fund, net service, monthly student payment and session charge in different classes, Reserve Fund, General Fund, Income & Expense Information (Last year), Development Information (Last 5 years).

4.6.2   Who actually data entry?
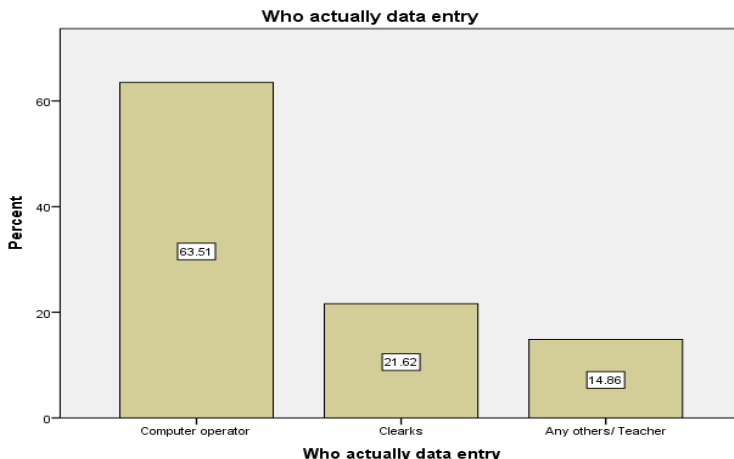
Figure 4.9: Actually data entry

From the above Figure 4.9, 63.51 percent of respondents to GC are computer operator. 21.62 percent of respondents have entered data in the EMIS cell by using clerks. 14.86 percent of respondents have done data entry by using a few teachers and outsourcing.

4.6.3   When data is updated in EMIS cell?

6.76 percent of respondents to the GC upgrade data weekly in the EMIS cell. 48.65 percent of respondent update data monthly for the EMIS cell. 16.22 percent of respondents to the GC update date quarterly in the EMIS cell. 2.70 percent of respondent upgrade data annually. 25.68 percent of respondents update their data on the order of an authority.

4.6.3.1 Facing problem in data entry

Table 4.11: Facing problem data entry time

		Frequency	*Percent*
	Yes	65	87.84
Valid	No	9	12.16
	Total	74	100

Source: Research Survey, 2021

From the above Table 4.11, 87.84 percent of respondents in GC face problems at the data entry time. But only 12.16 percent of respondents in GC think that they do not face problems at the data entry time.

4.6.4   Data back up

All responding GCs keep data backups.

4.6.5   Data storage device

Table 4.12: Data storage device

		Frequency	*Percent*
Valid	Pen drive	0	0
	Computer drive	29	39.2
	Pen drive and computer drive	45	60.8
	Total	**74**	**100.0**

Source: Research Survey, 2021

According to Table 4.12, 39.2 percent of respondents in GC keep their data only on a computer drive (hard disk). 60.8 percent of respondents in GC keep their data both on a pen drive and on a computer drive (hard disc).

4.6.6   Multi-year datasets linked

All respondents think that multi-year datasets have been linked.

4.6.7   Language of input data into the EMIS database

All responding GCs gave the opinion that both Bangla and English are being used for the EMIS database.

4.6.8   Who verifies the college data input in the EMIS cell?

77 percent of respondents in GC give the opinion that Upazila Education Officers (UEO) are verifying and inputting EMIS data. 2.7 percent of respondents in GC think that District Education Officers (DEO) verify the input of EMIS data. 1.4 percent of respondents in GC point out that Divisional Education officers verify the input of EMIS data. 18.9 percent of respondents in GC make the judgement that both UEO, DEO, and Divisional Education Officers verify the input EMIS data.

4.7 Budget/Funds

4.7.1   Source of fund for developing ICT unit

Table 4.13: Source of fund for developing ICT unit

		Frequency	*Percent*
Valid	Govt. Budget	0	0
	Internal	59	79.7
	Both (govt.& internal)	15	20.3
	Total	**74**	**100.0**

Source: Research Survey, 2021

As shown in Table 4.13, 79.7 percent of respondents at GC use the internal funds for developing ICT units. On the other hand, only 20.3 percent of respondents in GC use both government and internal funds.

4.7.2 How many funds are used for the purpose of ICT/EMIS development of the College?

But few responding GCs have gotten government funding for developing the ICT or EMIS during the fiscal years 2016–17, 2017–18, and 2018-19. On the other hand, the responding GC used average internal funds consecutively: 112972 (2016–17), 132973 (2017–18), and 159730 (2018-19). Both GCs have not gotten another fund.

4.7.3 Enough fund for developing ICT unit

All responding GCs think, their fund is not sufficient for developing ICT units. It has been found that all colleges need external funds or budgets to provide better ICT services.

4.7.4 Which types of EMIS related works are operated by this fund?

This fund is used in both government and private colleges to pay internet bills, service computers, and buy computer accessories.

4.7.5 How many funds are needed?

4.05 percent of respondents in GC have needed one lac taka. 5.41 percent of respondents in GC need 1.5 lac taka. 6.76 percent of respondents in GC want 2lac taka. 40.54 percent of respondents in GC need 2.5 lac taka. 4.05 percent of respondents in GC need 2.8 lac taka. 36.49 percent of respondents in GC need 3lac taka. 2.70 percent of respondents in GC need 3.5 lac taka. On the other hand, GC has needed an average of Tk. 257432.43 annually.

4.7.6 How many percentage funds are managed internally?

2.7 per cent of respondents in GC can manage an internal 50 percent fund. 1.4 percent of respondents in GC can manage 55 percent of the fund internally. 55.4 percent of respondents in GC were able to internally manage 60 percent of the annual cost. 20.3 percent of respondents in GC can internally collect 65 percent fund. 18.9 percent of respondents in GC were able to collect internally 70 percent of the annulling cost. 1.4 percent of respondents in GC can collect 75 percent of the funds.

5. Discussion

a) Human Resources/IT staffs

Existing IT-related technical staff are not sufficient, and some technical posts of IT staff (computer operator and computer lab assistant) are vacant at the GC level. On the other hand, 52.7% of computer lab assistant posts (Table 4.2) are

vacant at GC. These posts are already sanctioned in the GC. All college principals want IT-based professional posts such as programmers and MIS officers. The lack of professional IT staff has negatively affected the overall performance of these EMIS functions. For instance, because of a lack of technical staff, they are not capable of carrying out regular activities on time, specifically the delivery of EMIS data and statistics in time to central database managers, educational planners, and executives for their use in making plans and decision-making. Delays in the production of facts and information have reduced the usage of data and information because the data and information have not been available when they are required for making plans and decision-making. These results have been supported by previous research (Rodriguez-Diaz et al., 1997; Lacey and Ahmad, 1997; Ellison, 2004; LeBlanc and LeBlanc, 2004; Shah, 2008; Osano & Ngugi, 2018).

b) *Training and training quality of IT staffs*

Training on the use of ICT for management purposes in Government College is conducted in various ways. For example, it can be done through pre-service training and in-service training courses. In this study, in-service training course data is also used. At the GC level, ICT training courses for IT staff, teachers, and principals are offered by government institutes such as the HSTTI, NAEM, Teacher Training College, etc. Training is essential for using EMIS. All administrative IT employees, EMIS coordinators, and instructors, along with the principals of GC, have acquired training about the use of the EMIS. But those people belong to specific tiers concerning their prior understanding of ICT or the use of computers. Therefore, due to the various tiers of computer ability, specific people have required specific types of training. These specific training needs aren't considered. However, Wako (2003b) noted that at least three levels of training (basic knowledge of operating systems, word processing, spreadsheet programs, database operating skills, and use of internet facilities), intermediate (the basics of operating systems and troubleshooting, the use of the SPSS statistical package), and advanced (management, data analysis, programming, networking, and data processing) are needed for smooth use of the EMIS function. This study found that the majority of IT staff at GC have not gotten sufficient EMIS-related training. Comparatively, the IT staff at GC has fewer opportunities for IT-related training. This result is supported by Wako (2003b). Other findings show that the majority of IT staff at GC have needed basic and intermediate training. These findings have been associated with the findings reported by Reneau et al. (2019) and Wako (2003b). On the other hand, in this research, it was found that ICT training is not conducted regularly, the quality of the training course is moderately good, and existing IT training cannot fulfill the demands of college staff. In this study, these findings are similar to those of Ruivo et al. (2014), Kayanda et al. (2020), and Arifin and Tajudeen (2020).

c) Physical facilities/ Hardware and software

This study found that most of the GCs are allotted one room for IT staff and have one computer lab. However, 8% of GCs do not have one computer lab, and only a small number of GCs have sufficient computers. All of GC has an electricity connection, but a major portion of GC does not have a well-considered alternative arrangement for electricity in the load shading time. IT-related physical facilities are not sufficient as per EMIS requirements. On the other hand, this study found that most of the GCs require one room for IT staff, a computer, another computer lab, a server, printers, multimedia, photocopiers, and scanners. This study found that all GCs are using a medium software package such as Windows (operating system) and Microsoft Office (application software). They are generally satisfied with the software. However, advanced, specialized application software is not used in GC. Adequate IT equipment, software, and technical infrastructure are necessary for EMIS functions; however, some GCs are deficient in computer hardware. Some GCs no longer have sufficient office space to work properly. The findings referring to the sufficient equipment and advanced software program of GC have been consistent with the findings pronounced by the Save the Children UK study (2006), Nkata and Dida (2019), Chitolie-Joseph (2011), Villanueva (1990), Shah (2008), Demir (2006), Bright & Asare (2019), Patil & Dhembre (2019).

d) Computer Network Facility

.This study found that the majority of GCs do not have servers and LAN lines in their colleges; the majority of GCs use between 2 or 3 computers, which are of good quality for EMIS functions. The server is an important element for the database of all educational institutions. However, LAN lines are needed in educational institutions for communicating and transmitting internal information. Without an effective network and sufficient-quality computers, the EMIS function is always hampered. These findings are similar to the previous findings of Nkata and Dida (2019) and Abdullahi et al. (2018).

e) Internet Facility

This study found that few computers in all colleges are connected to the internet; the majority do not have a Broad Brand line; alternatively, they use a radio link line; the maximum responding GC areas internet speed is not a good position; and GC is using the internet for online data entry and accessing processed data. Speedy internet service is very important for data collection, dissemination, and communication. But, in Bangladesh, internet speed is comparatively better where a broadband internet line is available, even though internet speed is not as good as that of a broadband and radio link line. It is a high barrier to data entry, access, and communication. These findings have been associated with Sodhar et al. (2019), Margaret et al. (2018), Abdullahi et al. (2018), and Khan et al. (2012).

f) Communication, Data entry, Record system, and Fund

This study found that all GCs have their institutional website; the administration of GC uploads their academic and administrative data on the website, but the majority of responding GCs do not update their website promptly; all GCs easily use email, mobile, and manual processes for their official communication. However, all colleges have been highly reliant on manual processes until now. This communication process is time-consuming and costly. Using upgraded information technology enables us to overcome this barrier. These findings are supported by the previous findings of Tokgoz and Erdogan (2016), Pol Lim (2017), Nkata and Dida (2019), and Odhiambo (2017). However, these findings contrast with the findings of the European Commission (2011).

This study found that institutional, infrastructural, academic, and administrative data are to be input into the central database. The majority of GC is inputted data by the computer operator and clerk. Again, this study found that most of the GCs do not update data willingly and promptly in the central EMIS cell. For this reason, the Central EMIS database is not updated at this time. In addition, the majority of GCs are facing problems at the data entry time in the central EMIS cell. There are various problems arising in data entry, like a lack of an instructional manual, IT staff, low internet speed, a lack of training, and low system and service quality.

This study found that all responding GCs are keeping data backups, and the maximum number of responding GCs are using hard discs, while some are using pen drives. It is also found that all respondents think that multi-year datasets have been linked. Present and past data and information are important for decision-making. So, data and information are stored carefully. However, hard discs and pen drives are not suitable for data and information storage. In addition, information technologies help process data and keep electronic records, which helps decision-makers. These findings have been supported by Margaret et al. (2018) and Mukred et al. (2019). This study also found that both Bangla and English are the languages used for the EMIS database, and upazila education officers are verifying the maximum input of EMIS data. District and division education officers' contribution is very low in the data verification. Inputted data verification helps achieve good information. However, data verification is not strong. This has negatively affected the quality of the data. These findings are related to findings reported by LeBlanc & LeBlanc (2004), UIS (2005), and Shah (2008). Despite the variety of worker passers and lack of manpower, upazila education officers have gradually cheeked and verified inputted data.

This study found that the majority of responding GCs are utilizing their internal funds to develop ICT units. Both GC expenditures are increasing gradually. GC colleges need external funds or budgets to provide better ICT services of ICT. ICT budgets are used in both government and private colleges to pay internet bills, service computers, and buy computer accessories. All responding GCs have needed funds for the ICT of the EMIS service smoothly. Most of GC's internal financial ability is not good for the required annual cost. These findings have been related to the previous findings of Setiawan et al. (2018), Afshari et al. (2009), Lessen & Sorensen (2006), Chitolie-Joseph (2011), Shah (2008), Nkata and Dida (2019), and Adekeye (1997).

6.   Conclusion and Recommendations

The study sought to explore the existing situation of EMIS facilities at the government colleges' level in education management in Bangladesh. It was found that 100% of computer operators and 47.30% of computer lab assistants are in GC, but 52.7% (100%–47.30%) of computer lab assistant posts are empty at the GC level. GC (98.6%) does not have EMIS-related training. The majority of IT staff at GC have required basic (67.57%), intermediate (28.38%), and advanced (4.054%) training. It is found that the quality of the training course is moderately good. The different types of physical facilities and hardware components (office space, computer lab, computers, alternative elasticity arrangements, servers, printers, multimedia, photocopiers, scanners) are not adequate for EMIS-related work. Internet speeds are not good at the GC level, but colleges are using the internet for online data entry and accessing processed data. GCs are using email, mobile, and manual processes for their official communication for academic and administrative purposes. All responding GCs are keeping data backups, and the majority of responding GCs are using hard discs to keep data, and some are using pen drives. It is also found that the internal financial ability of most of GC is not good for the required annual cost for developing ICT units.

This research is time-bound for exploring the existing situation of EMIS facilities in Bangladesh. Using this study, GC, MOE, and DSHE in Bangladesh can easily classify the difficulties of remaining EMIS for effectively operating this system. The results of the study will be supportive of the principals of GC, policymakers, the higher authority of the education department, researchers, and educationists. This research will help improve the EMIS and prepare development plans and strategies for the modern digitalized education system.

The study recommends that the authority should appoint IT-skilled manpower and allocate sufficient funds to enable colleges to run EMIS smoothly. Besides, EMIS-related training should be made compulsory for principals (GC) and all administrative staff for professional development. The training agency of the education ministry should provide short, targeted workshops and training beyond the basic and intermediate training of computer literacy. Moreover, the

government should take crucial steps to ensure continuing the high-speed internet connection in the education ministry, DSHE, and GC. The study suggested that further studies will be done using a structural equation model to evaluate the effect of EMIS on college-level activities.

7.   Acknowledgement

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